Remarks

Claim Amendments

Claim 39 has been amended to recite the various elements related to cord treatment as directed to the tire structure rather than to the method of forming the polyester cord.

Rejections Under 35 U.S.C. Section 103

Claims 39, 40, 42-52, 54 and 55 are rejected under 35 U.S.C. Section 103 as unpatentable over Bonko '814 (US 5,337,814), Dunnom (US 3,738,948), Lee (US 3,660,340), Boon '219 (US 4,356,219) Toyoda '613 (US 4,963,613) and Watanabe (WO 01/14461) and optionally in view of Bonko '282 (US 6,062,282); claim 41 is rejected further in view of Barton '857 (US 3,554,857); claim 53 is rejected further in view of Schwarze '111 (US 3,842,111). These rejections are traversed. Applicants urge that no prima facie case of obviousness has been established over these references. Moreover, even if prima facie obviousness exists, the current specification includes evidence of unexpected results sufficient to overcome prima facie obviousness.

Applicants first note that even if prima facie obviousness exists (as noted herein, Applicants deny that a prima facie case of obviousness is made), the present specification includes evidence of unexpected results sufficient to overcome prima facie obviousness. Consideration of the data in the Examples reveals unexpectedly good adhesion of polyester cord to rubber commensurate in scope with the claims. In Examples 4 and 5 the combination of the recited cord treatment and the recited rubber composition in the illustrative rubber samples results in cord to rubber adhesion that is unexpectedly good in the cure environment characteristic of large tires having the tread characteristics recited in the claims. As seen in Examples 4 and 5, samples 10 and 11 compare the combined effects of excluding sulfenamide curative and the recited cord treatment on the adhesion of polyester to rubber. The following

table summarizes the adhesion results (from Tables 5 and 7, with normalized values to facilitate comparison):

Summary of Data from Examples 4 and 5

Sample No.	10	11	10	11
Rubber curatives (amounts in phr)				
2,2'-dibenzothiazyl disulfide	0.09	1.65		
sulfenamide	0.7	0		
Cure Cycle, minutes/ °C	Adhesion, N		Normalized Adhesion	
Polyester cord[1] treatment: Conventional RFL dip before yarn twist				
32/150[2]	188	323	1	1.72
137/160[3]	102	120	0.54	0.64
44/180[3]	92	74	0.49	0.39
Polyester cord[1] treatment: Polyepoxide and RFL dip after yarn twist				
32/150[2]	245	486	1.30	2.59
137/160[3]	203	282	1.08	**1.50**
44/180[3]	185	240	0.98	**1.28**

[2] adhesive activated polyester yarns, i.e., pretreated with polyepoxide
[2] cure cycle characteristic of passenger tires
[3] cure cycle characteristic of large lugged, agricultural and industrial tires

As seen from the data in the above table, the combination of the recited cord treatment and recited exclusion of sulfenamide in the rubber results in unexpectedly superior adhesion of the polyester cord to the rubber. Rubber Sample 10 contained the sulfenamide curative, and rubber Sample 11 excluded the sulfenamide. The results show:

- With the conventional RFL cord dip, exclusion of the sulfenamide in Sample 11 shows substantially improved adhesion compared with Sample 10 only for the passenger tire cure cycle, while the adhesion for the large lugged tire cure cycles shows little or no improvement.

- With the recited cord dip, exclusion of the sulfenamide in Sample 11 shows

substantially improved adhesion for all cure cycles, with the large tire cure cycles showing improved adhesion (normalized values of 1.50 and 1.28) much greater than would be expected based on the adhesion for the conventional dip for Sample 11 with excluded sulfenamide (0.64 and 0.39) or recited cord treatment for Sample 10 with sulfenamide (1.08 and 0.98).

Clearly, the data shows that the combination of the recited cord treatment and the exclusion of sulfenamide results in unexpectedly improved adhesion of the rubber to polyester cord in a large lugged, agricultural or industrial tire.

Applicants urge that this showing of unexpected results is sufficient to overcome prima facie obviousness. Only through the combination of the recited cord treatment and exclusion of sulfenamide curative is there obtained the improved adhesion of polyester cords to a rubber composition in a tire component of a pneumatic agricultural or industrial tire. As noted in the present specification and recited in the claims, agricultural and industrial tires characteristically feature large, thick tread lugs with low net to gross ratio. Cure of these tires requires long and/or high temperature cycles (such as, for example, 137 minutes at 160 °C or 44 minutes at 180 °C) to ensure complete cure of the thickest rubber components. While the high temperature and/or long duration cures are necessary to cure the thicker components, the extreme conditions may have deleterious effects on other, thinner components of the tire. Such is the case with the tire carcass, the belts and other inserts of textile cords where the high cure temperatures may interfere with the development of good adhesion between the cord and the rubber coat. In particular, adhesion between polyester cords and rubber in agricultural or industrial tires is often poor at best. Rubber compositions to date used in agricultural or industrial tires often contribute to poor adhesion between the cords and rubber. By contrast, as illustrated in the present specification, agricultural or industrial tires as recited in the claims show superior adhesion of polyester to rubber.

As for the alleged prima facie obviousness, the Examiner contends that such obviousness

may be found from a combination of the cited art. Applicants urge that no such obviousness exists; no motivation exists to combine the cited art. While each of the cited references may arguably teach one of the limitations of claim 1, it is to be noted that the Examiner relies on a combination of six prior art references to reject claim 1. Moreover, as motivation to combine the references, the Examiner repeatedly uses the justification that each of the limitations are known. While it may be true that these limitations are each known in the art, there is simply no teaching to combine the limitations in such a way as to arrive at the present claims. To find obviousness here is to simply engage in impermissible hindsight reconstruction based on the teaching of the present specification. Indeed, it is only in the present specification that such a tire is taught, and it is only in the present specification that the benefits of using the recited polyester cord treatment and the recited rubber composition are realized. Contrary to the Examiner's assertion, the data of Examples 4 and 5 illustrate that the practice of the invention results in a materially different product, in that the adhesion of the polyester cord to the rubber is surprisingly and unexpectedly higher than would have been expected based on the teaching of the prior art. Applicants urge that no prima facie obviousness exists.

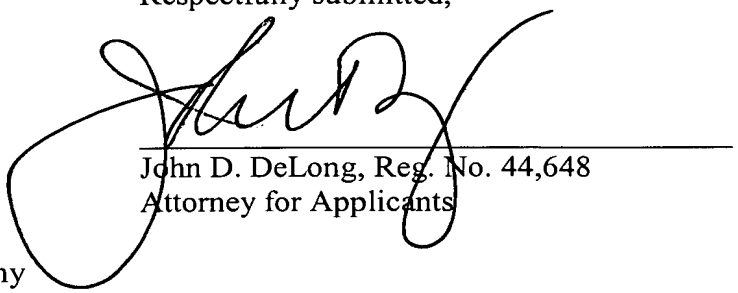
Double Patenting

The claims have been provisionally rejected on the ground of non-statutory obviousness-type double patenting over Serial No. 10/609,165 in view of Bonko '814, Dunnom and Lee. Applicants herewith submit a terminal disclaimer to obviate this rejection.

Conclusion

For all of the reasons above, Applicants respectfully request that the claims be allowed.

Respectfully submitted,



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